

High-Power, High-Efficiency 1.907nm Diode Lasers, Phase I

Completed Technology Project (2006 - 2006)



Project Introduction

nLight proposes to develop high-power, high-efficiency laser diodes emitting at 1907nm. Performance is expected to improve from the current state-of-the-art technology at 15C of 20% electrical-to-optical (E/O) conversion efficiency and 11.5W continuous-wave power (CW) to 25% E/O efficiency and 18W of CW power at the conclusion of Phase I. At the conclusion of Phase II, these values are expected to improve to 38% E/O efficiency and greater than 35W CW power. Quasi-CW power will be >>100W per laser bar. Such lasers meet the brightness and power requirements for the direct pumping of the quasi 4-level 5I7 to 5I8 transition in singly-doped Ho:YAG lasers. Compared to the diode-pumping of Thulium-sensitized Ho:YAG, direct diode pumping of Ho:YAG takes advantage of Holmium's much larger emission cross section, the absence of Ho:Tm up conversion, and Ho:YAG's large energy storage lifetime. Direct diode pumping of Ho:YAG also results in decreased system size, weight and complexity and an improvement in overall system efficiency when compared to pumping with a diode-pumped Th:YAG laser, all critical metrics for space and airborne platforms. This work could be extended to 18xxnm and 20xxnm quite readily with comparable power and efficiency performance.

Primary U.S. Work Locations and Key Partners

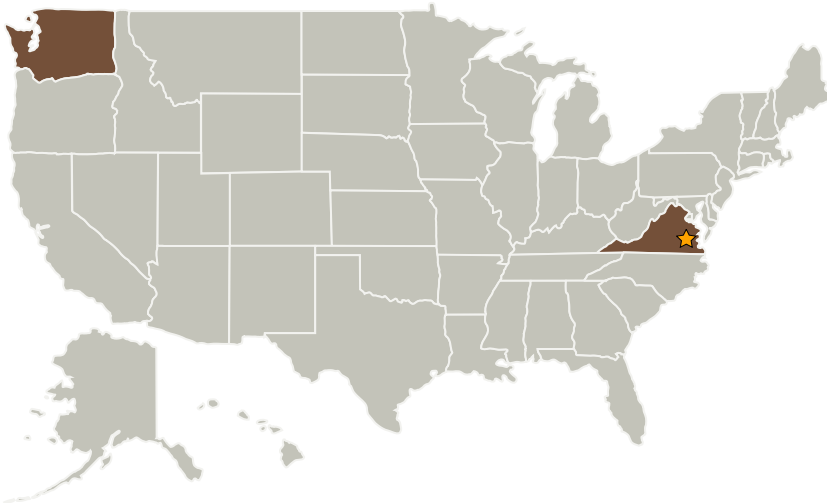
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Organizational
Responsibility**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
nLight Photonics Corporation	Supporting Organization	Industry	Vancouver, Washington

Primary U.S. Work Locations

Virginia	Washington
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation